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**Defense Information Infrastructure (DII)
Common Operating Environment (COE)**

**Software Requirements Specification (SRS)
for the
METOC Database Manager (MDBMAN) Segment
of the
Tactical Environmental Support System Next Century
[TESS(NC)]
Meteorology and Oceanography (METOC) Database**

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1 SCOPE

1.1 Identification

This Software Requirements Specification (SRS) describes the required capabilities of the Meteorology and Oceanography (METOC) Database Manager (MDBMAN) segment. MDBMAN is a Defense Information Infrastructure (DII) Common Operating Environment (COE)-compliant segment within the METOC Database (METDB) Computer Software Configuration Item (CSCI) of the Tactical Environmental Support System Next Century [TESS(NC)] system.

1.2 System Overview

The software described in this document is a DII COE-compliant software segment that supports the METDB database management component of TESS(NC) Navy Integrated Tactical Environmental Subsystem (NITES) I and II.

- NITES I –The local data fusion center and principal METOC analysis and forecast system (TESS(NC))
- NITES II –The subsystem on the Joint Maritime Command Information System (JMCIS) or Global Command and Control System-Maritime (GCCS-M) (NITES/Joint METOC Segment (JMS))

NITES I acquires and assimilates various METOC data for use by US Navy and Marine Corps weather forecasters and tactical planners. It stores these data and products in the METDB. NITES I provides users with METOC data, products, and applications necessary to support the warfighter in tactical operations and decision making. NITES I provides data and products to NITES I and II applications, as well as non-TESS(NC) systems requiring METOC data, in a heterogeneous, networked computing environment. Figure 1-1 pictorially represents the TESS(NC) System Overview.

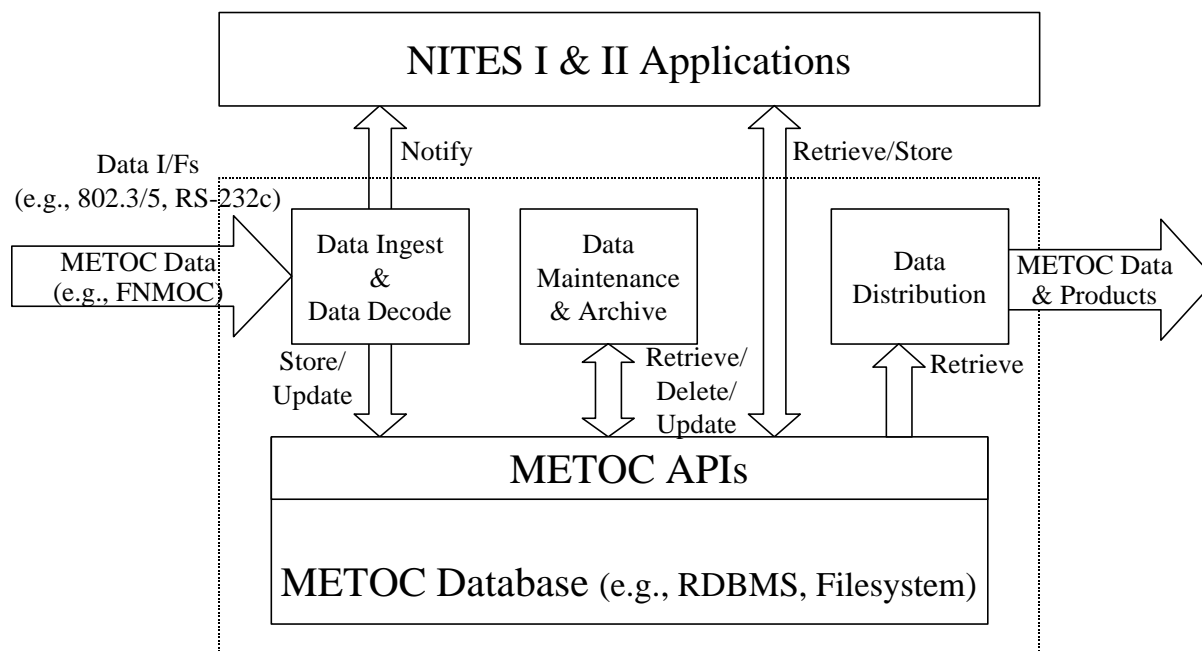


Figure 1-1. TESS(NC) System Overview

2 REFERENCED DOCUMENTS

2.1 Government Documents

STANDARDS

MIL-STD-498 *Software Development and Documentation*
5 December 1994

SPECIFICATIONS

Unnumbered *Software Requirements Specification for the Tactical Environmental*
30 September 1997 *Support System/Next Century [TESS(3)/NC] Meteorological and*
Oceanographic (METOC) Database, Space and Naval Warfare
Systems Command, Environmental Systems Program Office
(SPAWAR PMW-185), Washington, DC

Unnumbered *Performance Specification (PS) for the Tactical Environmental*
5 December 1997 *Support System/Next Century TESS(3)/NC (AN/UMK-3)*

OTHER DOCUMENTS

DII.COE.DocReqs-5 *Defense Information Infrastructure (DII) Common Operating*
29 April 1997 *Environment (COE) Developer Documentation Requirements,*
Version 1.0

Unnumbered *System/Sub-system Design Document (SSDD) for the Tactical*
16 September 1997 *Environmental Support System / Next Century TESS(3)/NC*
(AN/UMK-3) (NITES version I and II), Space and Naval Warfare
Systems Command, METOC Systems Program Office (SPAWAR
PMW-185), Washington, DC

Unnumbered *Database Design Description for the Tactical Environmental Support*
30 September 1997 *System/Next Century [TESS(3)/NC] Meteorological and*
Oceanographic (METOC) Database, Space and Naval Warfare
Systems Command, Environmental Systems Program Office
(SPAWAR PMW-185), Washington, DC

CM-400-18-05
February 1998

*User Interface Specifications for the Defense Information
Infrastructure (DII), Joint Interoperability and Engineering
Organization, Defense Information Systems Agency*

2.2 Non-Government Documents

None.

3 REQUIREMENTS

3.1 Required States and Modes

MDBMAN shall support background and foreground modes of operation. The foreground mode shall exist when the operator is running the MDBMAN user interface at a display terminal. The background mode shall be initiated by a system startup and run asynchronously thereafter to initiate scheduled (i.e., automated) maintenance activities or respond to MDBMAN user interface-initiated (i.e., manual) maintenance commands. These modes can exist concurrently.

3.2 MDBMAN Capability Requirements

3.2.1 General Requirements

3.2.1.1 MDBMAN Functionality

MDBMAN shall provide functionality to maintain the operational state of the METDB. The following METDB segments shall be supported by MDBMAN:

1. Grid Field Database (MDGRID) Segment
2. Textual Observation Database (MDTXT) Segment
3. Latitude-Longitude-Time (LLT) Observation Database (MDLLT) Segment
4. Imagery/Product Database (MDIMG) Segment
5. Remotely Sensed Database (MDREM) Segment

3.2.1.2 METDB Maintenance

Maintenance of the operational state of the METDB shall include purging, archiving, restoring, and browsing of METDB data and products as described in subsequent sections.

3.2.1.3 Hardware/Operating System

The software shall run under DII COE release 3.1, on a Hewlett-Packard computer running HP-UX 10.20 and a personal computer running the Microsoft Windows NT 4.0 operating system with Service Pack 3.

3.2.1.4 DII COE Compliance

MDBMAN shall be at least DII COE Level 5 compliant or as close to Level 5 compliant within the constraints of DII COE 3.1.

3.2.1.5 Data Processing

MDBMAN software shall be able to accurately process data (including, but not limited to, calculating, comparing, sequencing, and displaying) from, into, and between the 20th and 21st centuries, including leap-year calculations.

3.2.1.6 Access Control

Access to MDBMAN shall be restricted to the system or database administrator. Access shall be controlled through the database administration login.

3.2.2 Data Purge Requirements

3.2.2.1 Purge Capability

A purge capability shall be provided for data and products managed by the METOC database. There shall be at least two ways for a purge to be initiated: manually through the user interface, and automatically at scheduled times pre-selected by the operator. Only operators designated by the system administrator shall be capable of initiating this function.

3.2.2.2 Purge Notification

Before commencing scheduled purge operations, the application shall inform the system operator that the purge is about to begin and offer the option to delay initiation. Once initiated, the purging of data shall occur in the background requiring no further intervention.

3.2.2.3 Purge Criteria

The purge criteria shall be operator selectable and include data age, new data arrival, data type, model, tau, and resource limit.

3.2.3 Data Archive Requirements

3.2.3.1 Archive Capability

MDBMAN shall provide the capability to archive data to an off-line storage media device, such as a hard disk or tape. An operator-accessible index (e.g., catalog) of archived data shall be provided. The archiving operation shall be manually initiated by the operator through the user interface only.

3.2.3.2 Archive Data Selection

The data being archived shall be determined by the operator and shall consist of METOC data and products for specific date(s) and regions to support casualty analysis and special briefing needs.

3.2.4 Data Restore Requirements

3.2.4.1 Restore Capability

MDBMAN shall provide the capability for restoring data from an off-line storage media device, such as a hard disk or tape, to the appropriate METDB.

3.2.4.2 Data Restore Selection

The data to be restored shall be determined by the operator based on the operator-accessible index (e.g., catalog) of archived data.

3.2.5 Database Browser Requirements

MDBMAN shall provide functionality that allows the operator to view (i.e., browse) the contents of the METDB. MDBMAN, through the user interface, shall allow the operator to select a database of interest and view summary information about the current contents of that database. Controls shall be provided to allow selection and filtering of the database content.

3.2.6 User Interface Requirements

The MDBMAN user interface shall be available to the operator in the HP-UX and Windows/NT environments as defined under DII COE 3.1 in the TESS/NITES architecture. The user interface controls and functionality shall be consistent across those platforms and operate in the same fashion regardless of the platform (i.e., HP-UX or Windows) used.

3.2.6.1 DII Style Guide

MDBMAN user interface controls, including windows, layout, menus, buttons, labels, colors, fonts, etc., shall be compliant with the DII COE Style Guide.

3.2.6.2 On-line Help

MDBMAN shall provide an on-line help facility available at all times to the operator when operating the user interface. The help facility shall provide software user manual information in sufficient detail to allow the user to conduct all operations provided by the application. On-line help shall be supported in both the HP-UX and Windows/NT environments.

3.2.6.3 Manager Window

MDBMAN user interface shall be selected and initiated from a pull-down menu under the database administration login when run on the HP-UX platform. When run from the Windows/NT platform, it shall be available from the Start menu or as a Windows Short-cut.” When initiated, the manager window shall be displayed and provide indications of the available databases, pending maintenance operations, and operator controls in the form of menus and/or buttons. Controls to initiate the following operations shall be provided: select database, purge data, archive data, restore data, browse database, and display on-line help.

3.2.6.3.1 Select Database

The select database control shall allow the operator to select the METDB (e.g., grid) of interest. This control shall set the current database context for maintenance operations.

3.2.6.3.2 Purge Data

The purge data control shall cause a purge data window to be displayed. The purge control window shall provide controls to set purge (deletion) criteria for the database of interest.

3.2.6.3.3 Archive Data

The archive data control shall cause an archive data window to be displayed. This window shall provide the controls to set the archive criteria for the database of interest.

3.2.6.3.4 Restore Data

The restore data control shall cause a restore data window to be displayed. This window shall provide the controls to select the archived data for the database of interest to be restored.

3.2.6.3.5 Browse Database

The browse database control shall cause a METDB browser window to be displayed and allow the operator to browse the contents of the database of interest.

3.2.6.3.6 Help

The help control shall display the on-line help window and provide the operator with user manual-level information describing how to use and operate the MDBMAN user interface.

3.2.6.3.7 Pending Operations Display

The manager window shall provide a display of all pending database maintenance operations scheduled or currently under execution by MDBMAN. This display shall be labeled and at a minimum identify the pending operations by type (e.g., purge, archive), by frequency (e.g., daily, weekly), by database, and provide a status indicating whether or not the operation is currently executing.

3.2.6.3.8 Database Available Indication

The manager window shall provide a database available indication (i.e., available/not available) for each of the databases installed on the system. The database shall be considered available when a successful database connection can be established by the MDBMAN segment.

3.2.6.3.9 Percent Used Display

The manager window shall display a percent-used indication for each of the databases installed on the system. The percent used shall be updated each time the main window is instantiated (i.e., invoked) or by explicit operator request. The percent used shall be based on the amount of database space allocated at database installation time.

3.2.6.3.10 DTG Display

The manager window shall display the current date and time in Date-Time-Group (DTG) format. The DTG format shall be hhmmZ ddmmmyyyy; where hhmm equals hours and minutes, Z equals relative to Zulu, dd equals day 1-31, mmm equals a 3-letter month abbreviation, and yyyy equals a 4-digit year.

3.2.6.4 Purge Window

MDBMAN shall provide a purge control window to allow the operator to select the type of data to be purged and the frequency of the purge operations. The purge control window shall allow the operator to select the database of interest and configure the deletion criteria for the data and products in the database. The criteria for deletion shall include data type, data age, resource limit, model type (if applicable), forecast hour (if applicable), and new data arrival.

The purge window shall allow the operator to initiate a purge immediately or automatically at scheduled times with no operator intervention required (i.e., in background mode).

3.2.6.5 Archive Window

MDBMAN shall provide an archive control window to allow the operator to select the data to be archived. The archive control window shall allow for selection of archive device type (e.g., tape drive or disk), time and date range of interest, and area of interest to be archived. Support for associating a description with the archived dataset shall also be provided.

The archive control window shall provide a labeled control to explicitly initiate archive processing.

3.2.6.6 Restore Window

MDBMAN shall provide a restore control window to allow the operator to select archived data to be restored. The window shall allow specification of the restore device and provide a capability to review the description of the archived data contents.

The restore control window shall provide a labeled control to explicitly initiate restoration processing.

3.2.6.7 Browser Windows

MDBMAN shall provide a browser control window to support the selection of a database of interest and the database-specific filter criteria used for browsing the database. The browser control window shall provide a labeled control to explicitly initiate the database browse.

MDBMAN shall provide windows to display the current contents of the database of interest filtered according to the selection criteria established in the browser control window.

3.3 MDBMAN External Interface Requirements

This section describes MDBMAN external interface requirements.

3.3.1 MDBMAN External Interface Identification and Diagram

MDBMAN has external interfaces to the following TESS/NITES components and CSCIs:

1. METDB CSCI
2. Filter and Alert (FLTALT) CSCI
3. User Interface I/O
4. Archive/Restore Device
5. Operating System

Figure 3-1 identifies the external interfaces for MDBMAN.

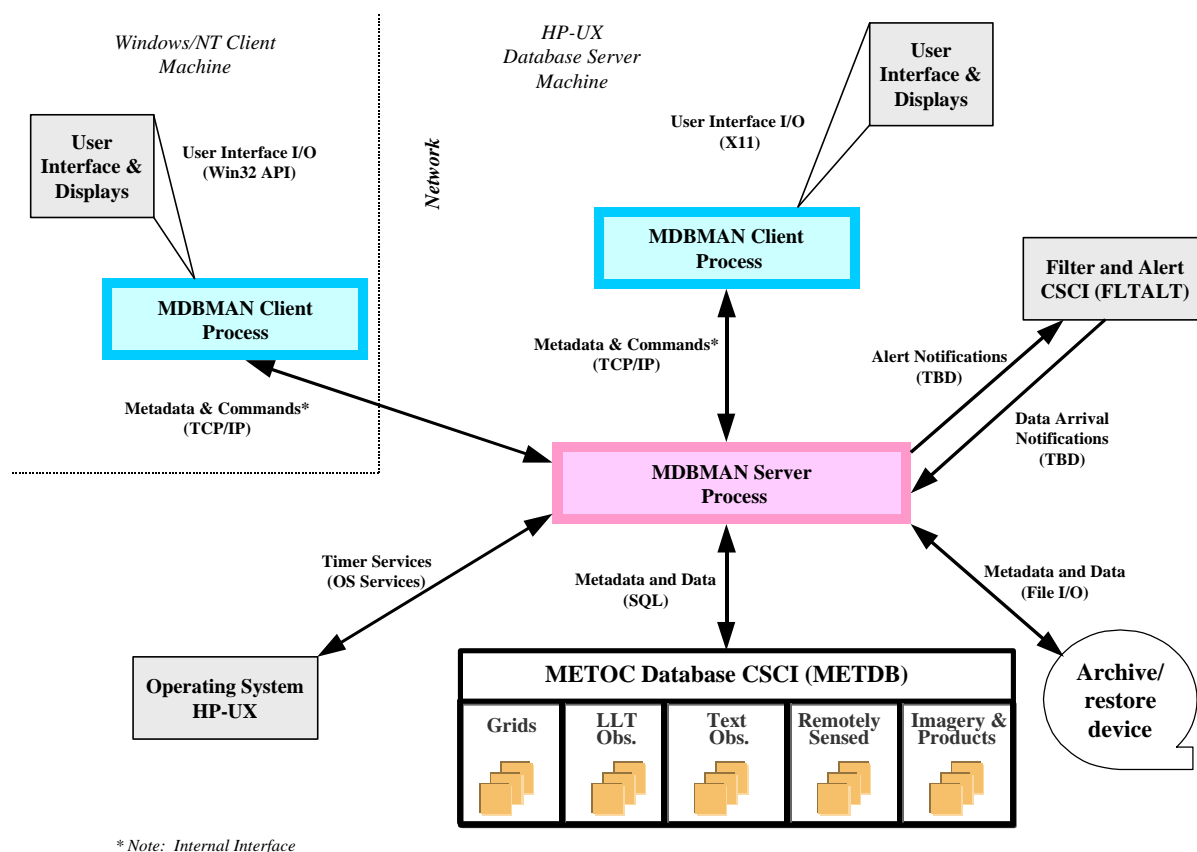


Figure 3-1. MDBMAN External Interfaces

3.3.2 METDB Interface

MDBMAN maintenance functionality requires direct interaction with the METDB. MDBMAN purge, archive, restore, and browse functionality requires reading, writing, updating, and deleting METDB metadata (i.e., description data) and data records. MDBMAN server shall rely on ANSI standard Software Query Language (SQL) and the Relational Database Management System (RDBMS) to support the interface and transfer of data between MDBMAN and METDB. This interface can be both asynchronous and synchronous depending on operator-initiated actions and/or scheduled purge operations.

3.3.3 FLTALT CSCI Interface

MDBMAN shall send error, warning, and informational notifications to FLTALT for operator-alert generation and display. These notifications result from MDBMAN internal or operator-initiated processing. MDBMAN shall receive error, warning, and information notification acknowledgment from FLTALT. MDBMAN shall also receive asynchronous notifications from FLTALT indicating that a data type of interest has been received by the TESS/NITES system. This notification shall be used to purge outdated or older sets of data of the same type currently stored in the METDB. This interface is asynchronous.

3.3.4 User Interface Displays and I/O Interface

MDBMAN will provide a user interface for initiation and control of database maintenance activities and informational displays. MDBMAN will rely on platform-specific graphics subsystems to support the user interface. This interface shall include screen, pointing device (e.g., mouse), and keyboard events and data related to MDBMAN controls. For UNIX platforms, MDBMAN shall use the X11/R5 (X-Windows) graphics subsystem and libraries. For PC or Windows NT, MDBMAN shall use the Windows 32-bit Application Programming Interface (Win32 API) graphic subsystem. This interface is event driven and asynchronous.

3.3.5 Archive and Restore Device I/O Interface

MDBMAN maintenance functionality requires operator-initiated archiving of METDB data to external devices, including DAT tape and hard disk media. MDBMAN must also read archived METDB data from the same external devices. MDBMAN shall archive and restore METDB metadata and data records to the external device using File I/O commands. The format of the metadata and data records is implementation specific. This interface is asynchronous with respect to archive and restore initiation and processing.

3.3.6 Operating System Interface

For time-related processing such as scheduled purges and current time display, MDBMAN shall rely on the HP-UX operating system services. This interface is event driven and synchronous.

3.4 MDBMAN Internal Interface Requirements

The MDBMAN internal interface requirements are left to the design.

3.5 MDBMAN Internal Data Requirements

The MDBMAN internal data requirements are left to the design.

3.6 MDBMAN Adaptation Requirements

MDBMAN has an explicit dependency on the METDB and Informix RDBMS segments.

3.7 Safety Requirements

There are no safety requirements specifically related to the MDBMAN CSCI. All safety requirements pertinent to any CSCI of the TESS/NITES apply.

3.8 Security and Privacy Requirements

The MDBMAN shall conform to the security and privacy requirements established for TESS/NITES.

3.9 MDBMAN Environment Requirements

The MDBMAN CSCI will run on the UNIX and Windows NT environments. See section 4 of the SSDD.

3.10 Computer Resource Requirements

This section identifies hardware and software requirements for the MDBMAN CSCI.

3.10.1 Computer Hardware Requirements

See section 4 of the SSDD.

3.10.2 Computer Hardware Resource Utilization Requirements

See section 4 of the SSDD.

3.10.3 Computer Software Requirements

See section 4 of the SSDD.

3.10.4 Computer Communications Requirements

See section 4 of the SSDD.

3.11 Software Quality Factors

MDBMAN shall meet at a minimum the software quality factors defined by the Level 5 DII COE Integration and Runtime Specification (I&RTS) compliance checklist.

3.12 Design and Implementation Constraints

The MDBMAN CSCI shall adhere to current DII COE specifications for packaging and integration of software.

3.13 Personnel-Related Requirements

Personnel operating MDBMAN shall be qualified or trained as TESS/NITES system or database administrators. Access to MDBMAN shall be restricted to the system or database administrator and controlled through the database administration login.

3.14 Training-Related Requirements

MDBMAN CSCI shall provide on-line help pages and a user manual.

3.15 Logistic-Related Requirements

This paragraph is tailored out.

3.16 Other Requirements

This paragraph is tailored out.

3.17 Packaging Requirements

MDBMAN shall be packaged and delivered as a DII COE segment and shall include the documentation identified in section 5.2 of the TESS(NC) PS. There are no additional packaging requirements related to the MDBMAN CSCI.

3.18 Precedence and Criticality of Requirements

The requirements stated herein are derived from requirements stated in the TESS(NC) PS, specifically those in sections 3.3.3.5.1 and 3.3.3.6, that relate to purging, archiving, and restoring METOC data. In the event of conflict, the requirements stated in the TESS(NC) PS take precedence over the requirements stated herein.

4 QUALIFICATION PROVISIONS

4.1 Qualification Methods

The following qualification methods shall be used to ensure that all MDBMAN software requirements have been satisfied:

Demonstration (D). Demonstration is a qualification method that is carried out by operation and relies on observable functional operation not requiring the use of elaborate instrumentation or special test equipment.

Analysis (A). Analysis is a qualification method that relies on the processing of accumulated data obtained from other qualifications.

Inspection (I). Inspection is a qualification method that is carried out by visual examination of the code and documentation.

4.1.1 Computer Software Test and Evaluation

Informal and formal Computer Software Test and Evaluation shall be performed to support the design and development of the software. The informal testing is defined in the next subparagraph. The formal testing is described in paragraph 4.1.3. The testing shall include evaluation of the following requirements:

The capability of the MDBMAN segment to purge METOC data as specified in section 3.2.2.

The capability of the MDBMAN segment to archive METOC data as specified in section 3.2.3.

The capability of the MDBMAN segment to restore METOC data as specified in section 3.2.4.

Table 4-1 shows the allocation of testing methods to the requirements above.

Table 4-1. Allocation of Testing Methods

Requirements Name	Qualification	
	Methods	Level
Purge METOC Data	A, D, I	1
Archiving METOC Data to Media	A, D, I	1
Restoring METOC Data to the Database	A, D, I	1

4.1.2 Preliminary Qualification Testing

MDBMAN shall be tested in a standalone fashion before being integrated with other segments, where possible. The integrated software shall be tested informally according to the test procedures and steps in the Software Test Description document with no errors or redlines to the test documentation before formal testing can occur.

4.1.3 Formal Qualification Testing

Formal qualification tests shall be performed on the target hardware to demonstrate compliance with all of the requirements specified in this document. The software shall be placed under configuration control at this time, and testing shall be performed by an independent testing group.

4.2 Special Qualification Requirements

No special tools, techniques, procedures, or facilities are anticipated for qualification testing of the MDBMAN segment.

5 REQUIREMENTS TRACEABILITY

The following matrix provides MDBMAN CSCI software requirements paragraph(s) satisfying the System Performance Specification requirement.

PS Requirement Paragraph No.	Performance Specification Requirement	SRS Requirement Paragraph No.
3.2.1	NITES I and II shall be at least DII COE Level 5 compliant.	3.2.1.3, 3.2.1.4
3.2.2	The NITES software shall be able to accurately process data (including, but not limited to, calculating, comparing, sequencing, and displaying) from, into, and between the 20th and 21st centuries, including leap-year calculations.	3.2.1.5
3.3.3.5.1	NITES I and II shall provide a purge capability for data and products managed by the METDB. There shall be at least two ways for a purge to be initiated – manually through the GUI, and automatically at scheduled times pre-selected by the operator.	3.2.2.1
3.3.3.5.1	Before commencing scheduled purge operations, the application shall inform the system operator that the purge is about to begin and offer the option to delay initiation. Once initiated, the purging of data shall occur in the background, requiring no further intervention.	3.2.2.2
3.3.3.5.1	The purge criteria shall be operator selectable and include data age, new data arrival, data type, model, tau, and resource limit.	3.2.2.3
3.3.3.5.1	Only operators designated by the system administrator shall be capable of initiating this function.	3.2.2.1
3.3.3.6	NITES I and II shall provide the capability for archiving data to and retrieving data from off-line storage media.	3.2.3.1, 3.2.4.1
3.3.3.6	An operator-accessible index of archived data shall be provided.	3.2.3.1

PS Requirement Paragraph No.	Performance Specification Requirement	SRS Requirement Paragraph No.
3.3.3.6	The data being archived or retrieved shall be determined by the operator and shall consist of METOC data and products for specific date(s) and regions to support casualty analysis and special briefing need.	3.2.3.2, 3.2.4.2

6 NOTES

6.1 Glossary of Acronyms

API	Application Program Interface
COE	Common Operating Environment
CSCI	Computer Software Configuration Item
DII	Defense Information Infrastructure
DTG	Date-Time-Group
FLTALT	Filter and Alert
GCCS-M	Global Command and Control System - Maritime
I&RTS	Integration and Runtime Specification
JMCIS	Joint Maritime Command Information System
JMS	Joint METOC Segment
LLT	Latitude-Longitude-Time
MDBMAN	METOC Database Manager
MDGRID	Grid Field Database
MDIMG	Imagery/Product Database
MDLLT	LLT Observation Database
MDREM	Remotely Sensed Database
MDTEXT	Textual Observation Database
METDB	METOC Database
METOC	Meteorology and Oceanography
NITES	Navy Integrated Tactical Environmental Subsystem
PS	Performance Specification

RDBMS	Relational Database Management System
SQL	Structured Query Language
SRS	Software Requirements Specification
SSDD	System/Sub-system Design Document
TESS(NC)	Tactical Environmental Support System Next Century